



COMPARISON OF CT AND SONOGRAPHY IN THE DIAGNOSIS OF APPENDICITIS

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ABSTRACT

For detecting acute appendicitis since decades, sonography and CT have been considered to be the two accurate tools. In previous studies, the sensitivities of CT has been reported to be 70-100 and the 91-99%. Coming to the sensitivities of sonography, it was reported as 75-90% and 86-100% in previous researches. In India, there are about 250,000 cases newly reported every year. The common surgical emergency of abdomen is acute appendicitis all over the world. In female the life time risk of appendicitis is approximately 6.7%. In males the lifetime risk of appendicitis was found to be 8.6%. Besides all these diagnosing techniques and advances in life sciences, the diagnoses of appendicitis is always a challenge for the health care professionals, especially in case of acute appendicitis. In pediatrics with equivocal clinical studies have been carried out more frequently. By preferring imaging radiology in university hospitals and other community or tertiary care hospital most of the sonography or CT scan was carried out. From the study it was diagnosed as 148(74%) acute appendicitis, 11(5.5%) general appendicitis, 3(1.5%) perforated appendicitis, 1(0.5%) subacute appendicitis, 1(0.5%) chronic appendicitis, 2(1%) periappendicitis, 2(1%) carcinoid/adenocarcinoma and other cases were 3(1.5%). It can be concluded that CT scan is the most accurate tool for diagnosing appendicitis in comparison with sonography.

Keywords :- CT scan, sonography, appendicitis, Carcinoid/adenocarcinoma, ultrasonography.

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INTRODUCTION

For detecting acute appendicitis since decades, sonography and CT have been considered to be the two accurate tools. In previous studies, the sensitivities of CT has been reported to be 70-100 and the 91-99% [1-3]. Coming to the sensitivities of sonography, it was reported as 75-90% and 86-100% in previous researches [4,5]. In India, there are about 250,000 cases newly reported every year. The common surgical emergency of abdomen is acute appendicitis all over the world. In female the life time risk of appendicitis is approximately 6.7%. In males the lifetime risk of appendicitis was found to be 8.6% [6].

Besides all these diagnosing techniques and advances in life sciences, the diagnoses of appendicitis is always a challenge for the health care professionals, especially in case of acute appendicitis [7]. As both laboratory findings and discriminative power of classic clinical outcomes remain low, the sign of pain at psoas or McBurney's point was diagnosed as classic physical examination findings for appendicitis historically [8]. As these signs increases the likelihood of appendicitis presence besides various physical exam findings for effective diagnosis of appendicitis [9].

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The traditional methods of diagnosis of acute appendicitis includes physical examination, history of the patient, presenting signs and symptoms and laboratory test findings. It is known that the negative diagnosis of acute appendicitis may be more than 50% in all over cases [10]. Complicated clinical course is the outcome of delay in diagnosis and treatment approach of appendicitis. Hence, in diagnosis of appendicitis, the CT scan and sonography has been studied in many studies [11,12]. In pediatrics with equivocal clinical studies have been carried out more frequently [13-15]. By preferring imaging radiology in university hospitals and other community or tertiary care hospital most of the sonography or CT scan was carried out[16].

AIMS:

- ✚ To evaluate the accuracy of computed tomography in diagnosing different types of appendicitis like acute appendicitis.
- ✚ To evaluate the accuracy of sonography in diagnosing different types of appendicitis.
- ✚ To compare the results of CT and sonography in accuracy of diagnosis.
- ✚ To study epidemiology of disease
- ✚ To study clinical presentations of the disease

OBJECTIVES:

- To help health care professionals and radiologists in performing accurate diagnosis of disease condition like appendicitis.
- To reduce mortality rate, that is caused by appendicitis in many cases.

METHODOLOGY:

All the materials and contents required for the study have been collected from Rajiv Gandhi Institute of Medical Sciences, Kadapa, Andhra Pradesh, India. Being a retrospective study it was carried out in tertiary care teaching hospital of Andhra Pradesh. The institutional review board of the hospital has given approval for carrying out the study. Study was carried out total of 200 patients, who have been diagnosed and undergone appendectomy.

Inclusion criteria:

- ✚ All patients presented and diagnosed to have appendicitis
- ✚ Patients aging more than 12 years of age
- ✚ Patients below 60 years of age
- ✚ Patients who have undergone appendectomy

Exclusion criteria:

- ✚ Patients with incomplete details like demographics, past medical history etc.,
- ✚ Patients with more than 60 years
- ✚ Patients under 12 years of age

- ✚ Patients presenting no symptoms of appendicitis

RESULTS & DISCUSSION:

The study was totally carried out in 200 patients, which included both men and women lying under the age group of 16–60 years and presenting with symptoms of appendicitis which included, abdominal cramps, severe stomach pain, vomiting, nausea and giddiness. On comparison with clinical assessment of various times of appendicitis by CT and ultrasonography scan, it was observed that the sensitivity of H & P was 81 and CT scan it is 82.8 and with ultrasonography it was 34.6. Specificity of 30.3 for H & P and 41.8 for CT scan and 70.9 for ultrasonography, positive predictive value Was Evaluated to be 85.4 with H & P and 81.7 for CT scan and 79.8 for ultrasonography. Negative predictive value for H & P was 25.8 and 41 for CT scan, 38.8 for ultrasonography. Accuracy was evaluated to be 74.6 for H & P, 73.9 for CT scan, 42.8 with Ultrasonography scanning, which is represented in the TABLE 1.

More than 90% of the cases included in the study have been brought to emergency department initially based on the severity of symptoms. As shown in the TABLE 2, the number of patients brought to ED admission and transferred to surgical consultation, h was recorded to be 4.3 ± 5.0 on H & P examination, added with abdominal x-ray film, it was 4.5 ± 2.4 , with ultrasonography it was 6.2 ± 7.2 , with CT scan it was 6.2 ± 7.2 and with patient's other complications it was 8.9 ± 13.0 , patients without complications was 4.7 ± 3.2 , coming to the patients admitted for appendectomy, h, it was recorded that the values ranged from 10.1 ± 12.8 with H & P examination, 11.0 ± 8.9 for added abdominal x-ray films, 13.1 ± 10.0 for ultrasonography, 18.9 ± 30.7 for CT scan, 16.2 ± 27.7 with respect to patients with other complications, and 10.5 ± 9.4 for patients without complications.

Pathologic findings of all the patients in the study have been recorded to analyse the prevalence and incidence of different types of appendicitis within the community. It was recorded as 32 patients presenting symptoms of appendicitis but do not have appendicitis in real, acute appendicitis was found to be reported in 148 patients which included 56 female and 82 male patients. General appendicitis was diagnosed with 11 patients among which 6 are of female and 5 are of male, perforated appendicitis was diagnosed in 1 female and 2 male patients, chronic appendicitis was diagnosed with 1 male patient, subacute appendicitis was diagnosed with 1 female patient, periappendicitis was diagnosed with 1 female and 1 male patient, carcinoid/adenocarcinoma type of appendicitis was diagnosed with 2 female patients in whole, and other types of unlisted appendicitis was diagnosed with 3 patients which included 1 female and 2 male patients. Which was clearly represented in the TABLE 3.

Study also included evaluation of negative appendectomy rate among the study population and perforated rate in patients with suspected acute appendicitis and brought to emergency department initially. The records of this analysis included 1 perforated appendicitis case in patients aged >12 years, and 4 cases of negative appendectomy falling under the age group of 12-30 years and 3 cases presenting with appendicitis and 1 case of perforated acute appendicitis,

in patients lying between the age group of 31-50 years, the negative appendectomy was reported in 2 patients and 1 patient was reported with acute appendicitis and 1 was diagnosed with perforated appendicitis, in age group of >50 years, negative appendectomy was reported in 1 patient and no case of acute appendicitis and 1 case of perforated acute appendicitis was reported. Which is clearly represented in TABLE 4.

Table 1: Comparison between clinical assessment, CT scan and ultrasonography in the Diagnosis of Acute appendicitis

	Health and physical examination (H & P)	CT Scan	Ultrasonography
Sensitivity	81	82.8	34.6
Specificity	30.3	41.8	70.9
Positive predictive value	85.4	81.7	79.8
Negative predictive value	25.8	41	38.8
Accuracy	74.6	73.9	42.8

Table 2: Preoperative care: time from emergency department (ED) admission to surgical consultation and appendectomy

	ED admission to surgical consultation, h	ED admission to Appendectomy, h
History & physical examination	4.3 ± 5.0	10.1 ± 12.8
History & physical examination and abdominal x-ray films	4.5 ± 2.4	11.0 ± 8.9
Ultrasonography	6.2 ± 7.2	13.1 ± 10.0
CT scan	7.5 ± 9.9	18.9 ± 30.7
Patients with complication	8.9 ± 13.0	16.2 ± 27.7
Patients without complication	4.7 ± 3.2	10.5 ± 9.4

Table 3: Final pathologic diagnosis in 200 patients with suspected acute appendicitis

Diagnosis	All (N = 200)	Female(N = 75)	Male (N = 125)
Normal	32(16%)	12(16%)	20(16%)
Acute appendicitis	148(74%)	56(74.6%)	82(65.6%)
General appendicitis	11(5.5%)	6(8%)	5(4%)
Perforated appendicitis	3(1.5%)	1(1.3%)	2(1.6%)
Chronic appendicitis	1(0.5%)	0(0.0%)	1(0.8%)
Subacute appendicitis	1(0.5%)	1(1.33%)	0(0.0%)
Periappendicitis	2(1%)	1(1.33%)	1(0.8%)
Carcinoid/adenocarcinoma	2(1%)	2(2.6%)	0(0.0%)
Other	3(1.5%)	1(1.33%)	2(1.6%)

Table 4: Age, negative appendectomy rate, and perforated rate in 200 patients with suspected acute appendicitis

Age, y	Negative appendectomy	Acute appendicitis	Perforated acute appendicitis
>12	1	0	1
12-30	4	3	1
31-50	2	1	1
>50	1	0	1

CONCLUSION:

From the study it was diagnosed as 148(74%) acute appendicitis, 11(5.5%) general appendicitis, 3(1.5%) perforated appendicitis, 1(0.5%) subacute appendicitis, 1(0.5%) chronic appendicitis, 2 (1%)

periappendicitis, 2(1%) carcinoid/adenocarcinoma and other cases were 3(1.5%). It can be concluded that CT scan is the most accurate tool for diagnosing appendicitis in comparison with sonography.

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